UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,125	05/10/2002	Yasuharu Asano	450101-03685	9907

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EXAMINER
WOZNIAK, JAMES S

ART UNIT	PAPER NUMBER
2626	

DATE MAILED: 12/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/019,125	ASANO ET AL.
	Examiner	Art Unit	
	James S. Wozniak	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 September 2006*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 May 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   In response to the office action from 9/12/2006, the applicant has submitted an

amendment, filed 9/28/2006, amending claims 1-5 and 8-9, while arguing to traverse the art

rejection based on the amended limitations *(Amendment, Pages 8-10)*. The applicant's

arguments have been fully considered but are moot with respect to the new grounds of rejection

in view of Higgins et al *(U.S. Patent: 5,218,668)*.

Specification

2.   The title of the invention is not descriptive. A new title is required that is clearly

indicative of the invention to which the claims are directed.

The following title is suggested: "Speech Recognition Device and Speech Recognition

Method and Recording Medium Utilizing Preliminary Word Selection Based on Different

Measures".

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making
and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
contemplated by the inventor of carrying out his invention.

4.   **Claims 1-9** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with

the written description requirement. The claim(s) contains subject matter which was not

described in the specification in such a way as to reasonably convey to one skilled in the relevant

art that the inventor(s), at the time the application was filed, had possession of the claimed

invention. Specifically, Claims 1, 8, and 9 recite an apparatus, method, and computer readable

medium featuring a means and step for calculating a *score of a concatenation of first and second*

selected words, which is not described in the specification. The concatenation score calculation

recited in the specification appears to refer to the concatenation of individual candidate words

(selected based on a first and second measure) and previous candidate words used to find a

highest-ranking path through a speech recognition tree structure *(see Fig. 3, Specification, Pages*

22-25 and 43). The concatenation score will be interpreted as a score calculated for each of the

selected candidate words based on the concatenation of each candidate and a previous candidate

sequence for the application of the prior art of record.

Also, Claims 1, 8, and 9 recite a means and step for selecting one or more words from a

plurality of words in input speech based on first and second measures, which is not described in

the specification. It appears that each selection measure chooses *candidate* words corresponding

to a plurality of input words *(i.e., first candidates based on acoustic score and second candidates*

based on enunciation time, see Specification, Pages 40-43) and does not select the actual words

from a plurality of input words as is recited in the presently claimed invention. The selected

words will be interpreted as candidate words corresponding to spoken words in input speech for

the application of the prior art of record.

Dependent claims 2-7 fail to overcome the 35 U.S.C. 112, first paragraph rejection

directed towards claims 1 and 8-9, and thus, are also rejected for failing to comply with the

written description requirement.

Thus, claims 1-9 fail to comply with the written description requirement.

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

6.   **Claims 1-9** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

Claims 1 and 8-9 recite the limitation "said score of a concatenation of said first and

second words" respectively in lines 10, 10, and 11. There is insufficient antecedent basis for this

limitation in the claim and it is unclear whether this limitation refers to the "score" referred to in

the preamble, which reflects an acoustic likelihood. It is also unclear whether the "score" used to

finalize a word string in the last means/step refers to the "score" referred to in the preamble or

the "score of a concatenation". The examiner has interpreted all of the aforementioned scores as

referring to the same "score of a concatenation" and will apply the prior art of record based on

such an interpretation. If this interpretation is correct, however, the preamble should be amended

to indicate that speech is recognized based on the "score of a concatenation" and not a "score

reflecting an acoustic likelihood" which refers to the score of a concatenation because of a

possible 35 U.S.C. 112, first paragraph issue *(i.e. concatenation score is based on both acoustic*

and language scores, Specification, Page 23- accumulating acoustic and language scores to find

the final score). Thus, the examiner suggests a claim amendment unifying the all of the

limitations referring to a "score" *(i.e., in preamble, calculation, and finalizing means/step)* as a

"score of a concatenation" in order to overcome this 35 U.S.C. 112, second paragraph issue and

any potential 35 U.S.C. 112, first paragraph issues.

Dependent claims 2-7 fail to overcome the 35 U.S.C. 112, second paragraph rejection

directed towards claims 1 and 8-9, and thus, are also rejected for failing to comply with the

written description requirement.

Claim Rejections - 35 USC § 102

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.   **Claims 1 and 7-8** are rejected under 35 U.S.C. 102(b) as being anticipated by Higgins et

al *(U.S. Patent: 5,218,668).*

With respect to **Claims 1 and 8**, Higgins discloses:

Extraction means for extracting characteristic values of said input speech, the input

speech comprising a plurality of input words *(speech parameter extraction, Col. 5, Lines 45-63;*

and input speech corresponding to a word sequence, Col. 6, Lines 16-46);

Selection means for selecting one or more first words from the plurality of input words to

be processed by speech recognition processing, based on a first measure calculated using said

characteristic values *(determining a first word hypothesis set based on a matching algorithm*

utilizing a keyword template, Col. 4, Lines 49-66; and Col. 6, Lines 16-46), and for selecting one

or more second words from the plurality of input words based on a second measure different

from said first measure *(determining a second word hypothesis set based on a matching*

algorithm utilizing a filler template relating to keywords, Col. 4, Lines 49-66; and Col. 6, Lines

16-46);

Score calculation means for calculating said score of a concatenation of said first and

second words selected by said selection means *(scoring a template string from a concatenation*

of existing candidates located in a phrase buffer with current template candidates, Col. 6, Lines

16-46; and Col. 8, Line 9- Col. 9, Line 65); and

Finalizing means for finalizing a words string, as the recognition result of said speech

based on said score *(finalized recognition output corresponding to a string of most likely word*

templates, Col. 6, Lines 63-67; and finalizing phrase recognition, Col. 9, Lines 26-54).

With respect to **Claim 7**, Higgins recites:

The selection means calculates said score using characteristic values of the speech to

select said first word based on said score *(extracted speech parameters used in keyword template*

matching, Col. 5, Lines 45-63; and Col. 6, Lines 16-21).

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10.   **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over Higgins et al in view of Hon et al *(U.S. Patent: 5,963,903)*.

With respect to **Claim 2**, Higgins teaches the speech recognition system utilizing keyword and alternative model matching to generate candidate hypotheses in recognizing an input speech sequence, as applied to claim 1. Higgins does not teach the use of an alternative hypothesis scoring means related to a specific number of phonemes satisfying a pre-set condition, however Hon teaches a means for a non-acoustic ranking and selection of phoneme recognition candidates in a word through a phoneme misrecognition count *(Col. 10, Lines 16-51)*.

Higgins and Hon are analogous art because they are from a similar field of endeavor in speech recognition. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Higgins with the phoneme ranking and selection means taught by Hon in order to implement an accurate alternative speech recognition system that does not require a user to speak a large number of words in training *(Hon, Col. 5, Lines 15-36)*.

11.   **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Higgins et al in view of Chiang et al *("On Jointly Learning the Parameters in a Character-Synchronous Integrated Speech and Language Model," 1996)*.

With respect to **Claim 3**, Higgins teaches the speech recognition system utilizing keyword and alternative model matching to generate candidate hypotheses in recognizing an input speech sequence, as applied to claim 1. Higgins does not teach the use of an alternative hypothesis scoring means related to related to a part-of-speech, however Chiang teaches an HMM based recognizer that utilizes part-of-speech tags in scoring to determine a best recognition hypothesis *(Page 168, Fig. 1)*.

Higgins and Chiang are analogous art because they are from a similar field of endeavor in speech recognition. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Higgins with the scoring means related to a part-of-speech tag as taught by Chiang in order to achieve an alternative recognition measure having an improved recognition rate and a reduced error rate *(Chiang, Page 168)*.

12.   **Claims 4 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Higgins et al in view of Franz et al *(U.S. Patent: 6,178,401)*.

With respect to **Claim 4**, Higgins teaches the speech recognition system utilizing keyword and alternative model matching to generate candidate hypotheses in recognizing an input speech sequence, as applied to claim 1. Higgins does not teach the use of an alternative hypothesis scoring means related to a linguistic likelihood, however Franz discloses the use of a language model that determines a score based on linguistics (Col. 6, Line 42- Col. 7, Line 6).

Higgins and Franz are analogous art because they are from a similar field of endeavor in speech recognition. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Higgins with the scoring means related to a

linguistic likelihood as taught by Franz in order to provide an alternative recognition means that

enhances the probability of selecting a correct recognition candidate *(Franz, Col. 6, Line 61- Col.*

7, Line 6).

With respect to **Claim 9**, Franz further recites implementing a speech recognition method

as a program stored on a computer readable medium *(Col. 2, Lines 42-67).*

13.   **Claims 5-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Higgins in

view of Holt et al *(U.S. Patent: 5,960,447).*

With respect to **Claim 5**, Higgins teaches the speech recognition system utilizing

keyword and alternative model matching to generate candidate hypotheses in recognizing an

input speech sequence, as applied to claim 1. Higgins does not teach the use of a storage means

for memorizing speech recognition results and using the results in a subsequent alternative

recognition, however Holt discloses a means for storing a confidence score from a recognition

engine for use in a speech recognition process *(Col. 9, Lines 7-61).*

Higgins and Holt are analogous art because they are from a similar field of endeavor in

speech recognition. Thus, it would have been obvious to a person of ordinary skill in the art, at

the time of invention, to modify the teachings of Higgins with the confidence score storage

means taught by Holt in order to provide an improved alternative speech recognition means for

editing and correcting speech recognition results *(Holt, Col. 1, Line 65- Col. 2, Line 21).*

With respect to **Claim 6**, Holt further recites:

Inputting means for providing an input for correcting the results of speech recognition;

wherein said storage means stores the results of the speech recognition corrected by the input

from said inputting means *(editing a recognition result and updating a confidence score, Col. 9,*

Lines 36-61).

Conclusion

14.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure:

Oerder *(U.S. Patent: 5,634,083)-* teaches a speech recognition system that concatenates

current candidates to preceding candidate string data to finalize a top ranking speech recognition

result.

Juang et al *(U.S. Patent: 5,710,864)-* teaches the use of two different speech recognition

networks for producing alternative hypothesis results.

Gupta et al *(U.S. Patent: 6,138,095)-* discloses the use of two different speech decoders

in speech recognition.

Rose et al ("A Hidden Markov Model Based Keyword Recognition System," 1990)-

discloses a speech recognition system utilizing keyword and filler models.

Rose et al ("A Training Procedure for Verifying String Hypotheses in Continuous Speech

Recognition," 1995)- teaches the use of two different speech recognition networks for producing

alternative hypothesis results.

15.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632.

The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

       If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David Hudspeth can be reached at (571) 272-7843. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

       Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak
12/1/2006
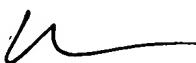
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